



# TEST DATA OF LCA15S-15

(100V INPUT)

Regulated DC Power Supply

Date : June 17. 1999

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Design Manager

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Design Engineer

コーワセル株式会社  
COSEL CO., LTD.



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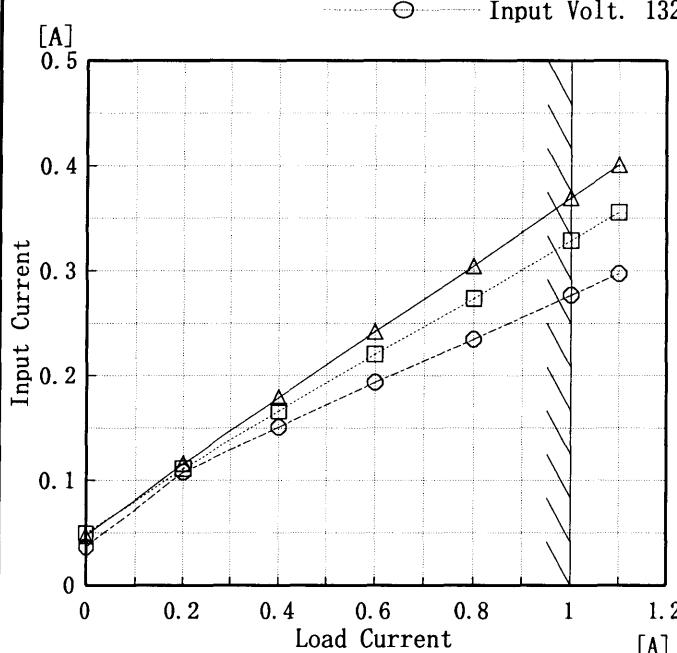
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Model	LCA15S-15	Temperature Testing Circuitry	25°C Figure A																																
Item	Line Regulation 静的入力変動																																		
Object	+15.0V1A	2. Values																																	
1. Graph	<p>Load 50% </p> <p>Load 100% </p>																																		
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1. Graph	<p style="text-align: center;"> <span style="color: black;">△</span> Input Volt. 85V  <span style="color: gray;">□</span> Input Volt. 100V  <span style="color: gray;">○</span> Input Volt. 132V         </p>  <p>The graph plots Input Current [A] on the y-axis (0 to 0.5) against Load Current [A] on the x-axis (0 to 1.2). Three curves are shown for different input voltages: 85V (solid line with triangles), 100V (dashed line with squares), and 132V (dotted line with circles). All curves show a positive linear relationship between input current and load current. A slanted line is drawn across the graph, starting from approximately (0.1, 0.05) and ending at (1.0, 0.35), indicating the range of the rated load current.</p>																																																									
2. Values	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Current [A]</th> </tr> <tr> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>0.047</td><td>0.049</td><td>0.036</td></tr> <tr><td>0.2</td><td>0.116</td><td>0.111</td><td>0.108</td></tr> <tr><td>0.4</td><td>0.179</td><td>0.167</td><td>0.151</td></tr> <tr><td>0.6</td><td>0.242</td><td>0.220</td><td>0.194</td></tr> <tr><td>0.8</td><td>0.305</td><td>0.274</td><td>0.235</td></tr> <tr><td>1.0</td><td>0.370</td><td>0.329</td><td>0.277</td></tr> <tr><td>1.1</td><td>0.401</td><td>0.356</td><td>0.297</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>			Load Current [A]	Input Current [A]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	0.0	0.047	0.049	0.036	0.2	0.116	0.111	0.108	0.4	0.179	0.167	0.151	0.6	0.242	0.220	0.194	0.8	0.305	0.274	0.235	1.0	0.370	0.329	0.277	1.1	0.401	0.356	0.297	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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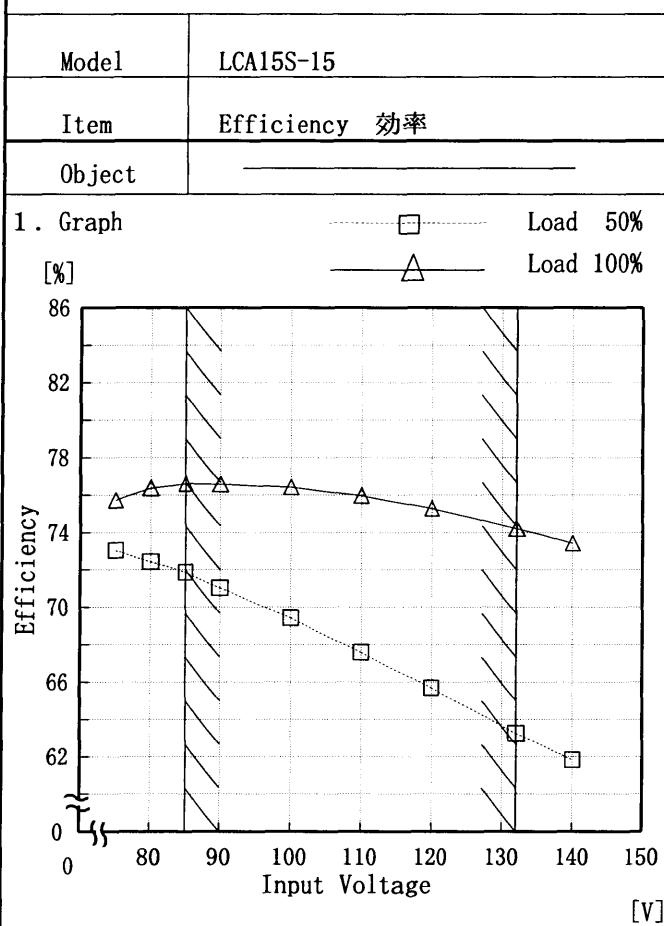
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Item	Input Power (by Load Current) 入力電力 (負荷特性)	Temperature Testing Circuitry	25°C Figure A																																																							
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Note: Slanted line shows the range of the rated load current

(注)斜線は定格負荷電流範囲を示す。

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Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	73.0	75.7
80	72.4	76.4
85	71.9	76.6
90	71.0	76.6
100	69.4	76.4
110	67.6	76.0
120	65.7	75.3
132	63.2	74.2
140	61.8	73.4

Note: Slanted line shows the range of the rated input voltage.

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**COSEL**

Model	LCA15S-15																																																					
Item	Efficiency (by Load Current) 効率(負荷電流特性)	Temperature 25°C	Testing Circuitry Figure A																																																			
Output	_____																																																					
1. Graph	<p>Graph showing Efficiency (%) vs Load Current (A) for LCA15S-15 at 25°C. Three curves are shown for Input Voltages 85V, 100V, and 132V. A slanted line indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 85V [%]</th> <th>Input Volt. 100V [%]</th> <th>Input Volt. 132V [%]</th> </tr> </thead> <tbody> <tr> <td>0.2</td> <td>57</td> <td>53</td> <td>44</td> </tr> <tr> <td>0.4</td> <td>68</td> <td>66</td> <td>59</td> </tr> <tr> <td>0.6</td> <td>73</td> <td>72</td> <td>67</td> </tr> <tr> <td>0.8</td> <td>76</td> <td>74</td> <td>71</td> </tr> <tr> <td>1.0</td> <td>77</td> <td>76</td> <td>74</td> </tr> <tr> <td>1.1</td> <td>77</td> <td>76</td> <td>75</td> </tr> </tbody> </table>			Load Current [A]	Input Volt. 85V [%]	Input Volt. 100V [%]	Input Volt. 132V [%]	0.2	57	53	44	0.4	68	66	59	0.6	73	72	67	0.8	76	74	71	1.0	77	76	74	1.1	77	76	75																							
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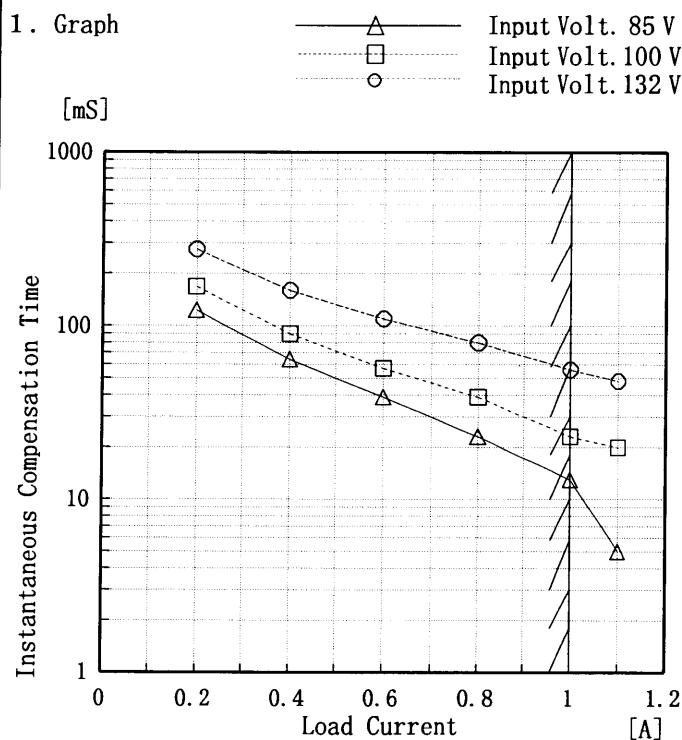
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Item	Hold-Up Time 出力保持時間																																	
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<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p> <p>出力保持時間とは、入力電圧断から出力電圧が、定電圧精度の規格範囲を保持しているところまでの時間。</p> <p>(注)斜線は定格入力電圧範囲を示す。</p>																																		

**COSEL**

Model	LCA15S-15
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+15.0V1A

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Load Current [A]	Time [mS]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
0.0	—	—	—
0.2	123	168	276
0.4	64	90	160
0.6	39	57	110
0.8	23	39	80
1.0	13	23	56
1.1	5	20	48
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.

Note: Slanted line shows the range of the rated load current.

瞬時停電保障時間とは、出力電圧が定電圧精度の規格範囲を保持している瞬時停電時間をいう。

(注) 斜線は定格負荷電流範囲を示す。

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**COSSEL**

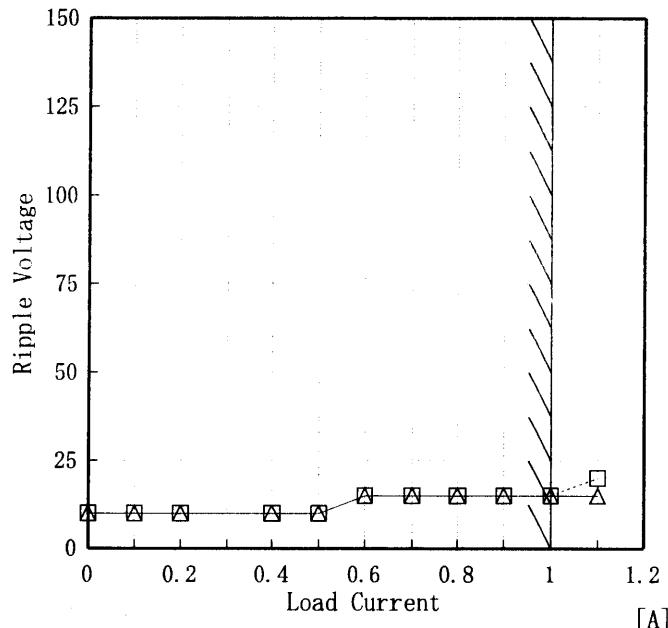
Model LCA15S-15

Item Ripple Voltage(by Load Current)  
リップル電圧(負荷電流特性)

Object +15.0V1A

1. Graph

□ Input Volt. 85V  
△ Input Volt. 132V

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Load Current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
0.00	10	10
0.10	10	10
0.20	10	10
0.40	10	10
0.50	10	10
0.60	15	15
0.70	15	15
0.80	15	15
0.90	15	15
1.00	15	15
1.10	20	15

Ripple Voltage is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

リップル電圧は、下図 p - p 値で示される。

(注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line  
入力商用周期  
T2: Due to Switching  
スイッチング周期

T2

Ripple [mVp-p]



T1

Fig. Complex Ripple Wave Form

図 リップル波形詳細図

**COSEL**

Model	LCA15S-15	Temperature Testing Circuitry	25°C Figure A																																						
Item	Ripple-Noise リップルノイズ																																								
Object	+15.0V1A																																								
1. Graph	<p>-----□----- Input Volt. 85V        [mV] -----△----- Input Volt. 132V</p>																																								
2. Values	<table border="1"> <thead> <tr> <th rowspan="2">Load current [A]</th> <th>Input Volt. 85 [V]</th> <th>Input Volt. 132 [V]</th> </tr> <tr> <th>Ripple-Noise [mV]</th> <th>Ripple-Noise [mV]</th> </tr> </thead> <tbody> <tr> <td>0.00</td><td>15</td><td>15</td></tr> <tr> <td>0.10</td><td>15</td><td>15</td></tr> <tr> <td>0.20</td><td>15</td><td>15</td></tr> <tr> <td>0.40</td><td>15</td><td>15</td></tr> <tr> <td>0.50</td><td>15</td><td>15</td></tr> <tr> <td>0.60</td><td>15</td><td>20</td></tr> <tr> <td>0.70</td><td>20</td><td>20</td></tr> <tr> <td>0.80</td><td>20</td><td>20</td></tr> <tr> <td>0.90</td><td>20</td><td>20</td></tr> <tr> <td>1.00</td><td>35</td><td>20</td></tr> <tr> <td>1.10</td><td>—</td><td>—</td></tr> </tbody> </table>			Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]	Ripple-Noise [mV]	Ripple-Noise [mV]	0.00	15	15	0.10	15	15	0.20	15	15	0.40	15	15	0.50	15	15	0.60	15	20	0.70	20	20	0.80	20	20	0.90	20	20	1.00	35	20	1.10	—	—
Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]																																							
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Fig. Complex Ripple Wave Form  
 図 リップル波形詳細図

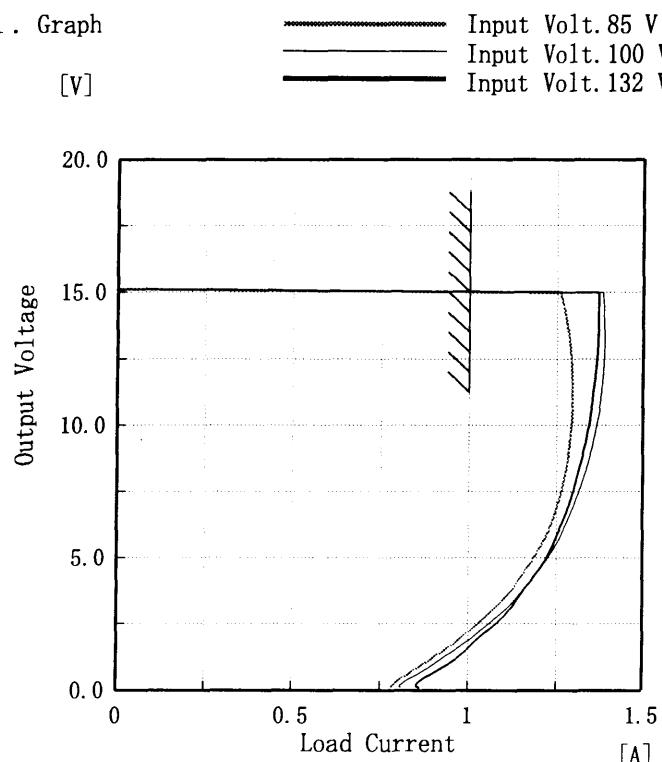
**COSEL**

Model LCA15S-15

Item Overcurrent Protection  
過電流保護

Object +15.0V 1A

## 1. Graph



Note: Slanted line shows the range of the rated load current.

(注)斜線は定格負荷電流範囲を示す。

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

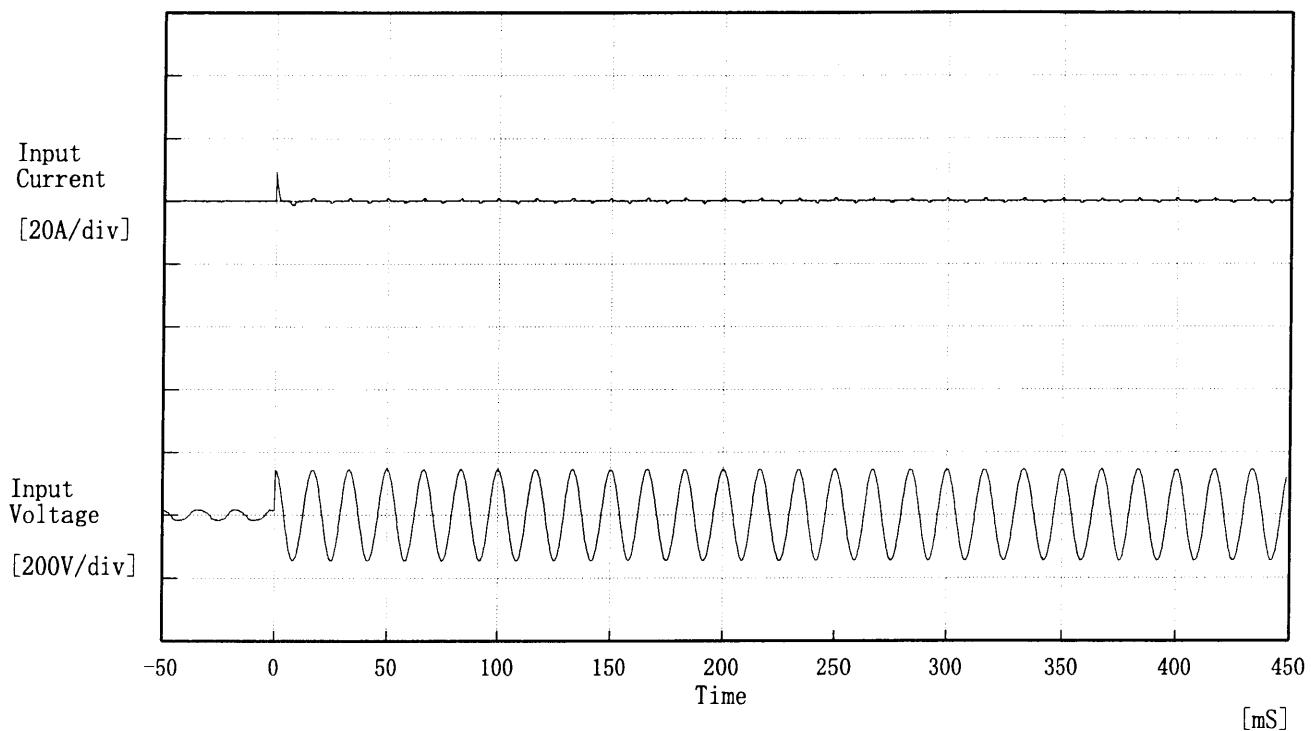
Output Voltage [V]	Load Current [A]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
15.00	1.26	1.38	1.37
14.25	1.27	1.39	1.37
13.50	1.28	1.39	1.37
12.00	1.30	1.38	1.36
10.50	1.30	1.37	1.35
9.00	1.29	1.35	1.33
7.50	1.26	1.32	1.30
6.00	1.23	1.27	1.26
4.50	1.16	1.20	1.20
3.00	1.08	1.11	1.12
1.50	0.93	0.96	0.99
0.00	0.78	0.81	0.86

COSEL

Model LCA15S-15

Item Inrush Current 突入電流

Object \_\_\_\_\_

Temperature 25°C  
Testing Circuitry Figure A

Input Voltage 100 V

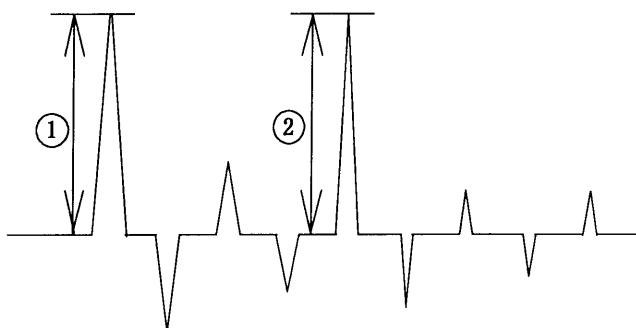
Frequency 60 Hz

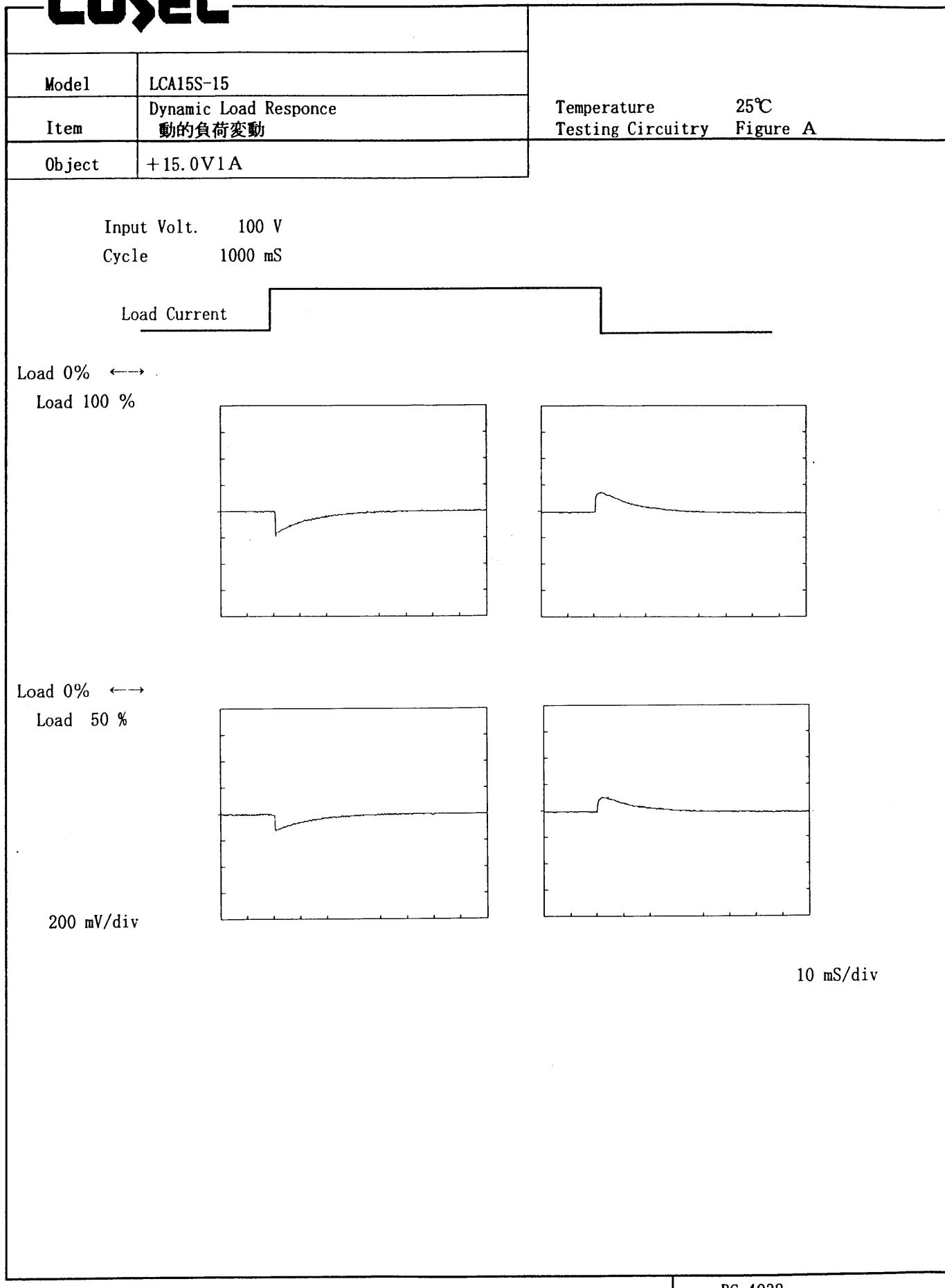
Load 100 %

Inrush Current

① 8.96 [A]

② 1.04 [A]



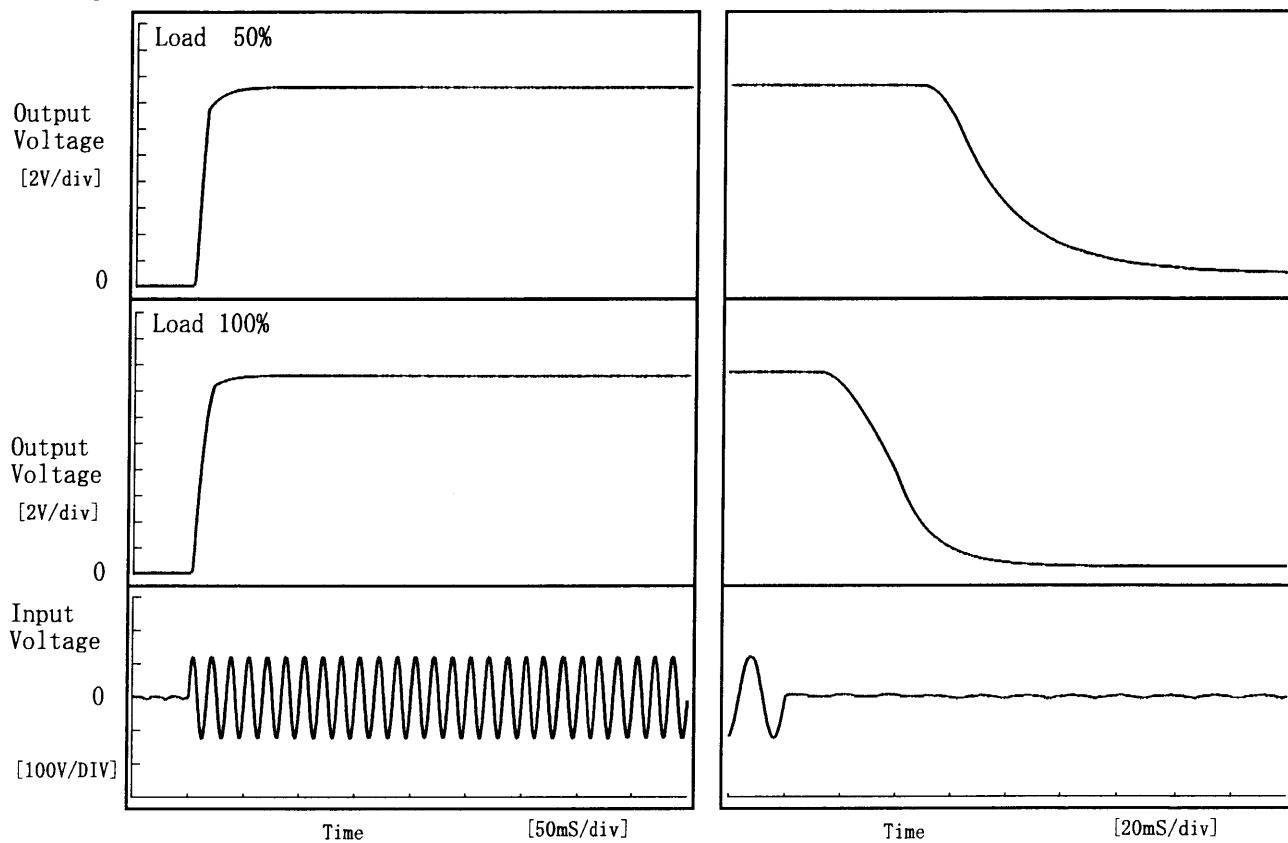
**COSEL**

**COSEL**

Model	LCA15S-15
Item	Rise and Fall Time 立上り、立下り時間
Object	+15.0V1A

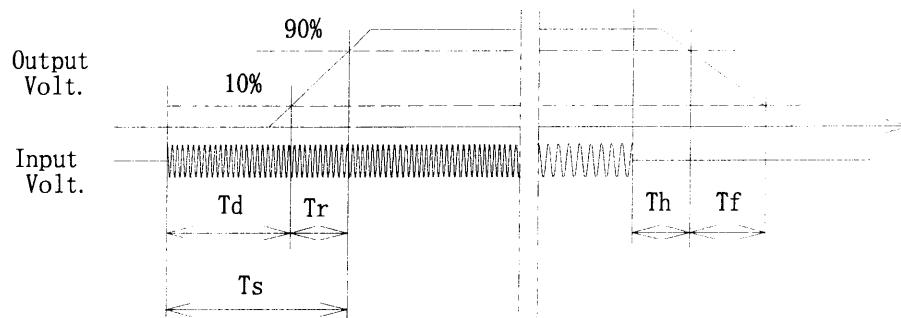
Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

Load	Time	T <sub>d</sub>	T <sub>r</sub>	T <sub>s</sub>	T <sub>h</sub>	T <sub>f</sub>	[mS]
50 %		4.3	10.8	15.0	58.6	74.0	
100 %		4.3	14.8	19.0	23.9	41.0	



**COSSEL**

Model	LCA15S-15																																																					
Item	Ambient Temperature Drift 周囲温度変動																																																					
Object	+15.0V1A																																																					
1. Graph																																																						
			2. Values																																																			
<p>—△— Input Volt. 85V        -□- Input Volt. 100V        -○- Input Volt. 132V</p>			<table border="1"> <thead> <tr> <th rowspan="2">Temperature [°C]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>15.086</td><td>15.086</td><td>15.085</td></tr> <tr><td>-10</td><td>15.092</td><td>15.092</td><td>15.091</td></tr> <tr><td>0</td><td>15.096</td><td>15.096</td><td>15.095</td></tr> <tr><td>10</td><td>15.099</td><td>15.098</td><td>15.097</td></tr> <tr><td>20</td><td>15.100</td><td>15.099</td><td>15.098</td></tr> <tr><td>25</td><td>15.100</td><td>15.099</td><td>15.098</td></tr> <tr><td>30</td><td>15.107</td><td>15.108</td><td>15.103</td></tr> <tr><td>40</td><td>15.107</td><td>15.107</td><td>15.103</td></tr> <tr><td>50</td><td>15.108</td><td>15.108</td><td>15.103</td></tr> <tr><td>60</td><td>15.108</td><td>15.108</td><td>15.102</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	Temperature [°C]	Output Voltage [V]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	-20	15.086	15.086	15.085	-10	15.092	15.092	15.091	0	15.096	15.096	15.095	10	15.099	15.098	15.097	20	15.100	15.099	15.098	25	15.100	15.099	15.098	30	15.107	15.108	15.103	40	15.107	15.107	15.103	50	15.108	15.108	15.103	60	15.108	15.108	15.102	—	—	—	—
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Note: Slanted line shows the range of the rated ambient temperature.																																																						

(注) 斜線は定格周囲温度範囲を示す。

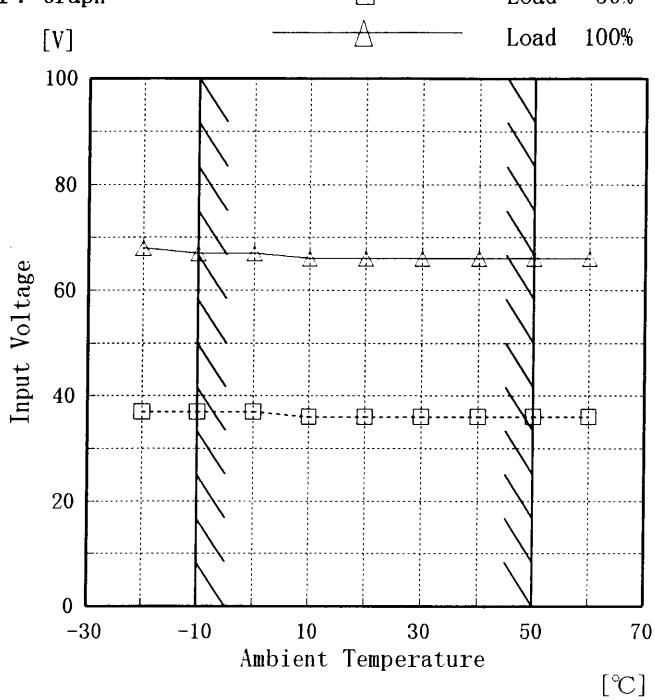
COSEL

Model LCA15S-15

Item Minimum Input Voltage for Regulated Output Voltage  
最低レギュレーション電圧

Object +15.0V 1A

## 1. Graph



Testing Circuitry Figure A

## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	37	68
-10	37	67
0	37	67
10	36	66
20	36	66
30	36	66
40	36	66
50	36	66
60	36	66
—	—	—
—	—	—

Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

**COSSEL**

Model LCA15S-15

Item Ripple Voltage (by Ambient Temp.)  
リップル電圧 (周囲温度特性)

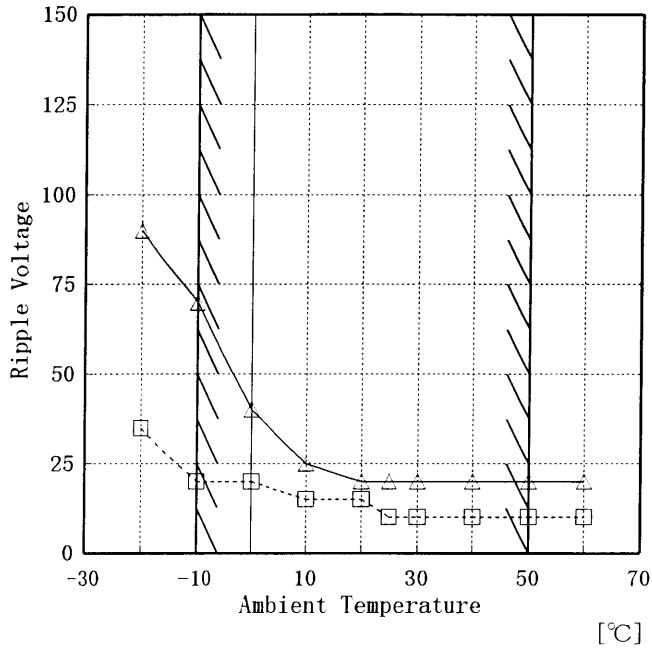
Object +15.0V1A

1. Graph

-----□----- Load 50%

-----△----- Load 100%

[mV]



Input Volt. 100 V

Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

Testing Circuitry Figure A

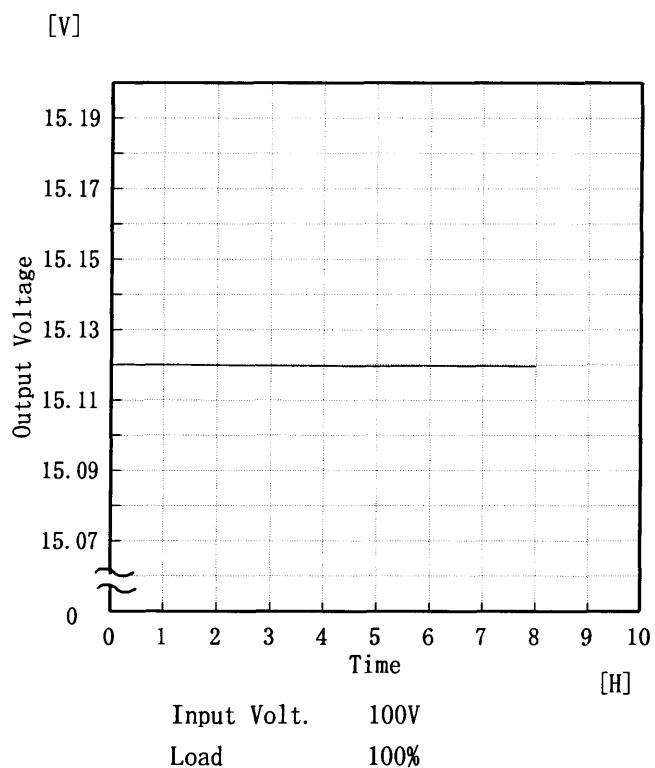
2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	35	90
-10	20	70
0	20	40
10	15	25
20	15	20
25	10	20
30	10	20
40	10	20
50	10	20
60	10	20
—	—	—

**COSEL**

Model	LCA15S-15
Item	Time Lapse Drift 経時ドリフト
Object	+15.0V1A

## 1. Graph



## 2. Values

Time since start [H]	Output Voltage [V]
0.0	15.121
0.5	15.120
1.0	15.120
2.0	15.120
3.0	15.120
4.0	15.120
5.0	15.120
6.0	15.120
7.0	15.120
8.0	15.120



Model	LCA15S-15	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+15.0V1A	

#### Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature -10~50 °C

Input Voltage : 85~132 V

Load Current : 0~1 A

\* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

$$* \text{ Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

#### 定電圧精度

周囲温度、入力電圧、負荷電流を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

周囲温度 -10~50 °C

入力電圧 85~132 V

負荷電流 0~1 A

\* 定電圧精度(変動値) = ±(出力電圧の最高値-出力電圧の最低値) / 2

$$* \text{ 定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	50	85	1	15.110		
Minimum Voltage	-10	132	1	15.091	±10	±0.1



Model	LCA15S-15		
Item	Condensation 結露特性	Testing Circuitry	Figure A
Object	+15.0V1A		

### 1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 25°C and the humidity is 40%RH.
- ③ Testing electrical characteristics of the unit to confirm there be no fault.

### 1. 結露特性試験

入力を切った状態で、恒温槽で-10°Cに冷却しておき、約1時間後に恒温槽から取り出し、室温25°C、湿度40%RHの状態におき結露させ、その電気的特性の測定を行い、異常のないことを確認する。

### 2. Values

Item	Data	Testing Conditions
Output Voltage [V]	15.1	Input Volt.:100V, Load Current:1A
Line Regulation [mV]	6	Input Volt.:85~132V, Load Current:1A
Load Regulation [mV]	10	Input Volt.:100V, Load Current:0~1A



Model	LCA15S-15		
Item	Leakage Current 漏洩電流	Temperature Testing Circuitry	25°C Figure B
Object	<hr/>		

### 1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	0.08	0.08	0.11
(B) IEC60950	0.08	0.09	0.12

### 2. Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

交流入力の両相について測定し、その大きい方を漏洩電流測定値とする。

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 230 [V]	Input Volt. 264 [V]
(B) IEC60950	—	—	—



Model	LCA15S-15	Temperature Testing Circuitry Figure C	25°C
Item	Line Noise Tolerance 入力雑音耐量		
Object	+15.0V1A		

### 1. Results

Pulse Width [ nS ]	MODE	No protection failure should occur 保護回路の誤動作がない	DC-like Regulation of Output Voltage 出力電圧の直流的変動
50	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation
1000	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation

### 2. Conditions

Input Voltage : 100 V  
 Pulse Voltage : 2000 V  
 Pulse Cycle : 10 mS  
 Pulse Input Duration : 1 min. or more  
 Load : 100 %

COSEL

Model	LCA15S-15	Temperature Testing Circuitry	25°C Figure D
Item	Conducted Emission 雜音端子電圧		
Object	<hr/>		

## 1. Graph

## Remarks

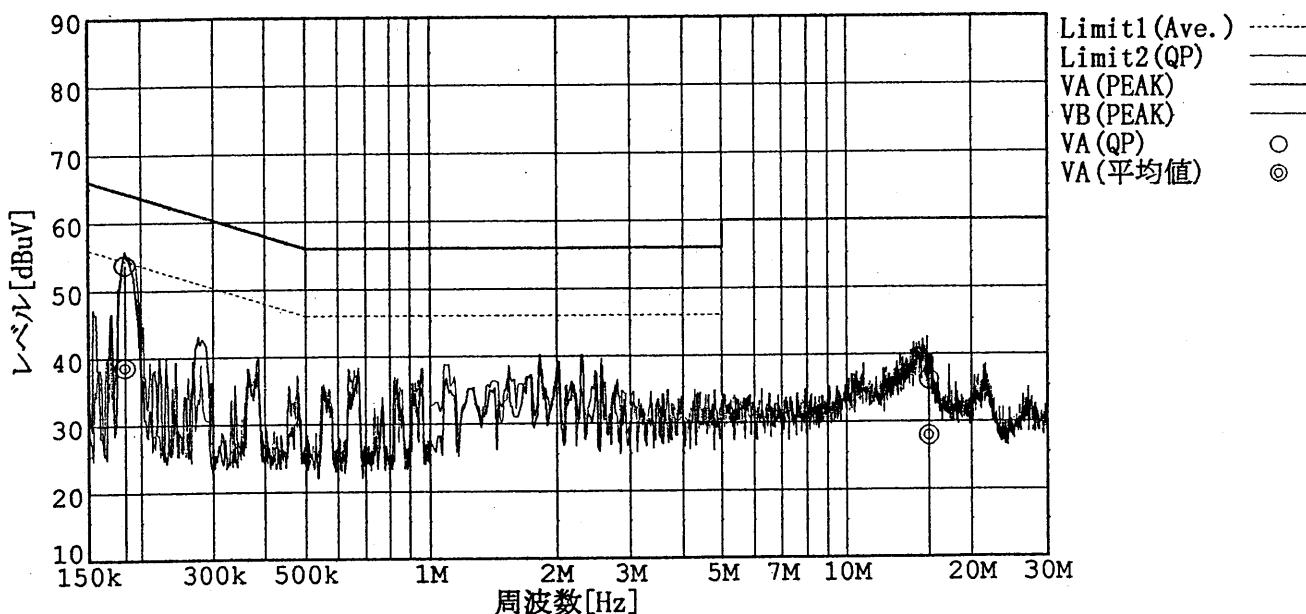
Input Volt. 100 V (VCCI Class B)

120 V (FCC Class B)

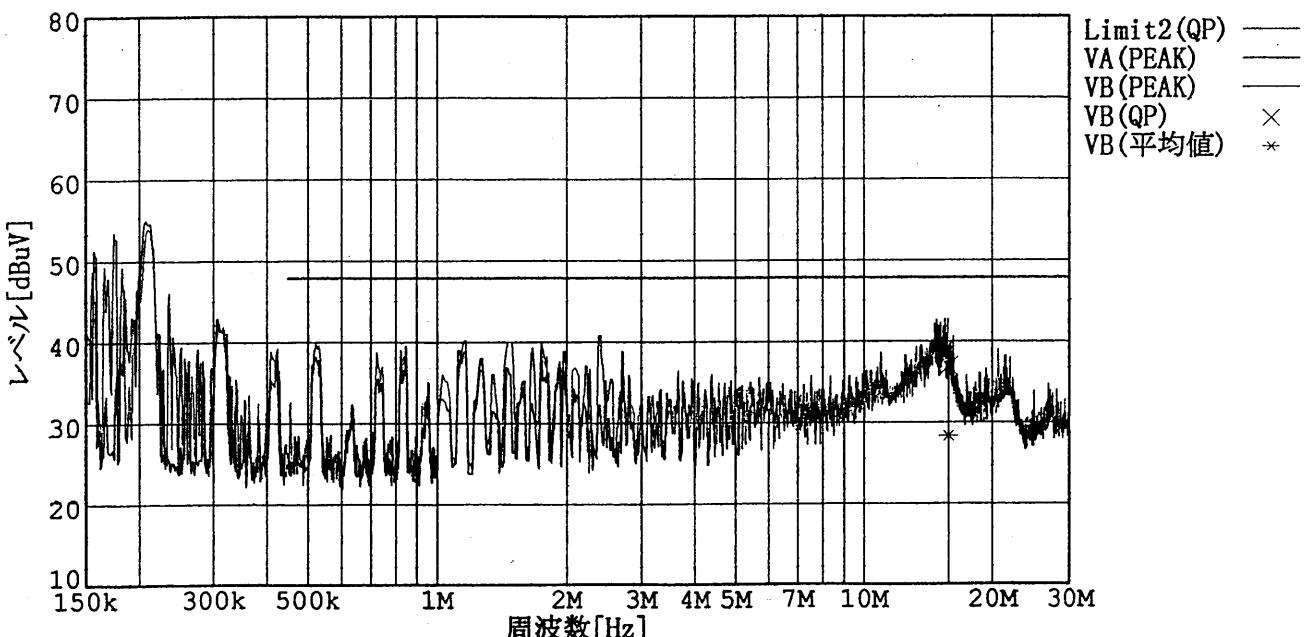
Load 100 %

規格1：[VCCI] Class B(平均値)

規格2：[VCCI] Class B(QP)



規格2：[FCC Part15] Class B



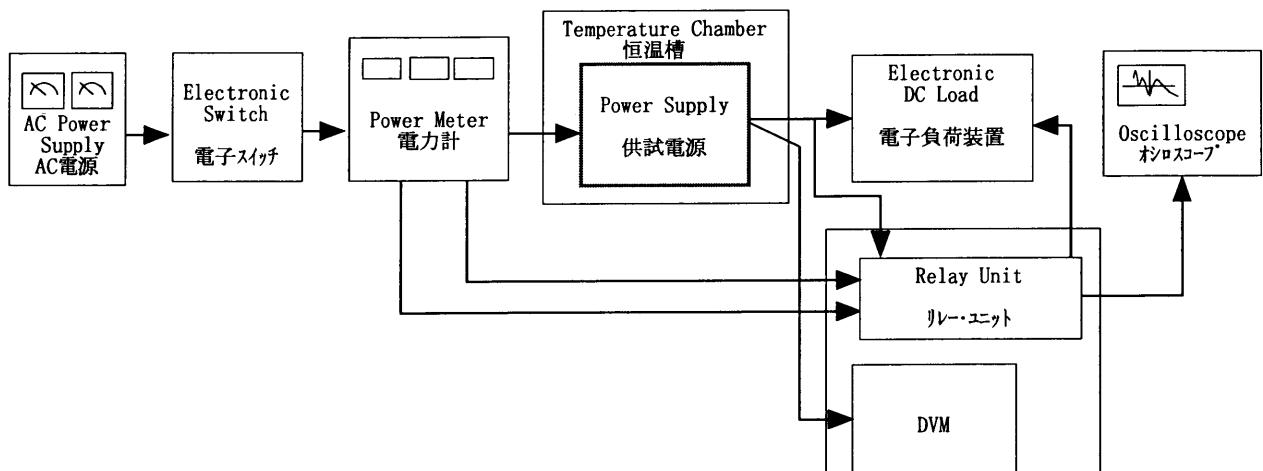


Figure A

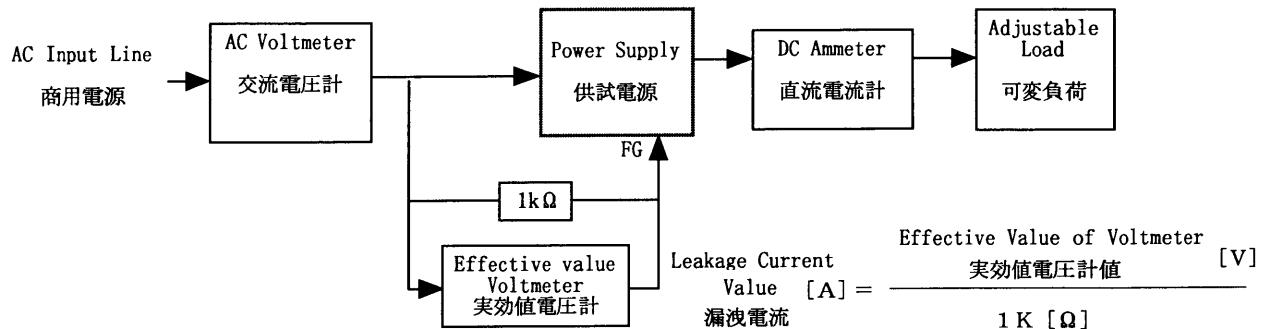


Figure B (DENTORI)

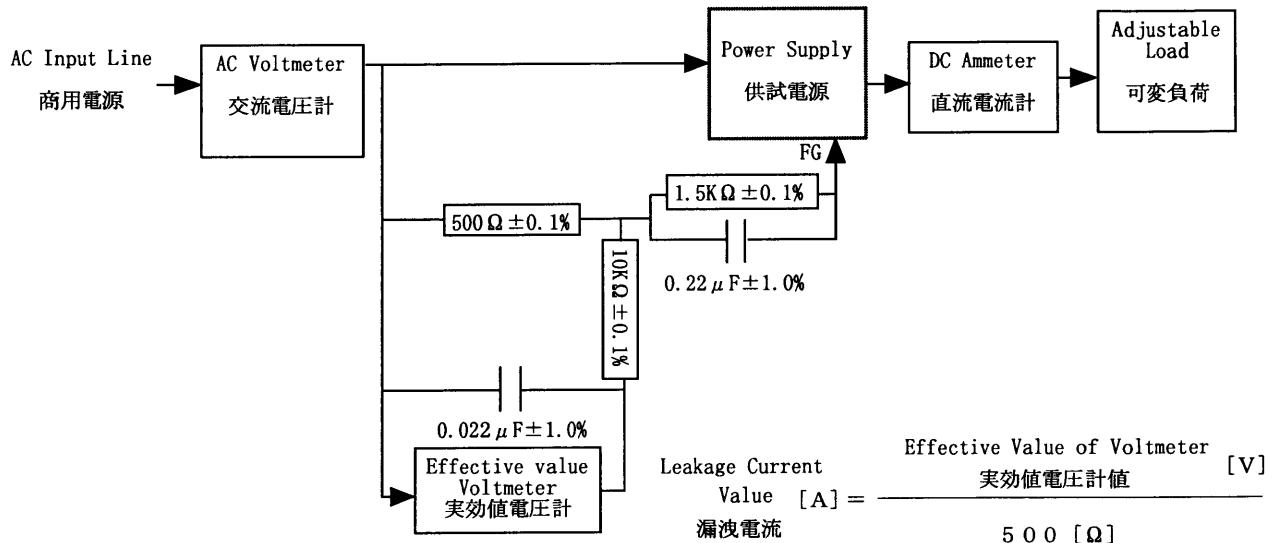


Figure B (IEC 60950)

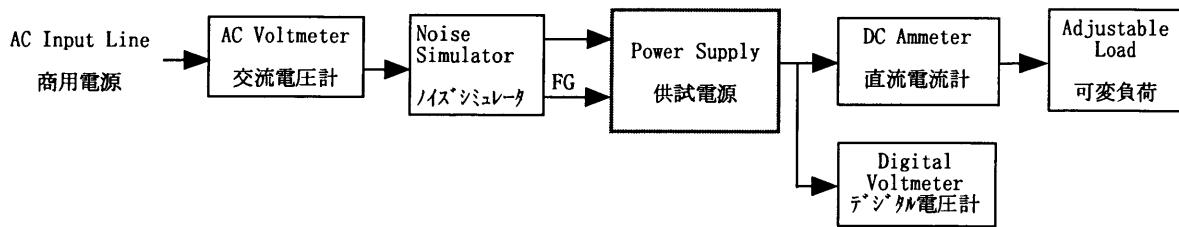


Figure C

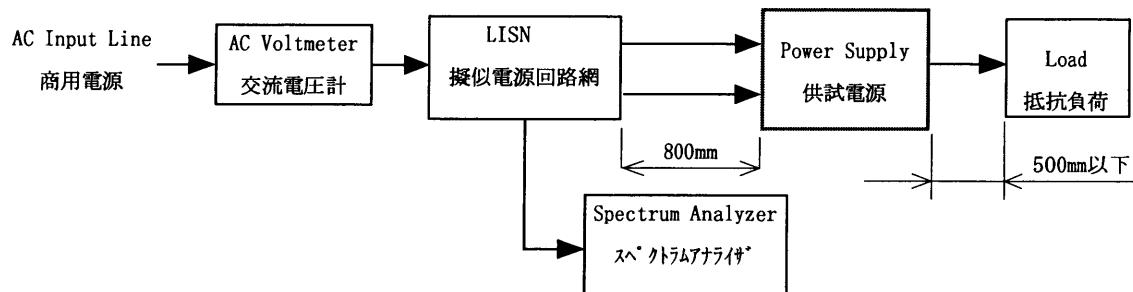


Figure D

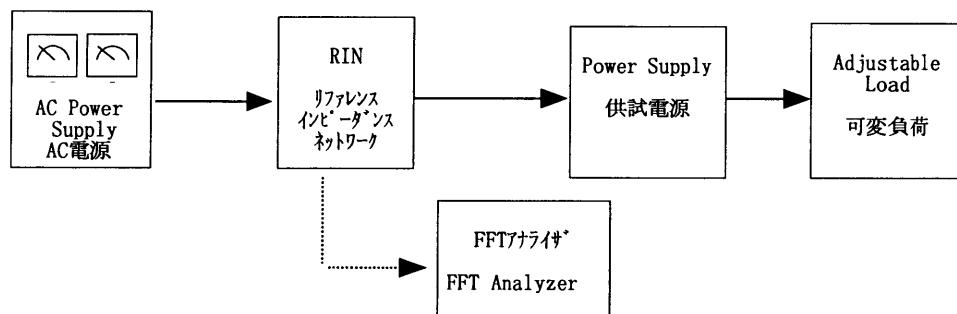


Figure E